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SOME POINTS OF INTEREST IN BONE SURGERY WITH SPECIAL REFERENCE TO BUNION WORK*

T. L. DEAVOR, M. D.
SYRACUSE, NEW YORK.

Not many years ago, bone surgery consisted almost entirely of the treatment of osteomyelitis and similar conditions, together with the adjustment of fractures, simple and compound, trusting the outcome to the mysterious processes of nature; and the results were passably good. Reconstruction and conservation of bone tissue were desired, but not fully realized. Later, however, when the injury was very severe, greatly disorganizing the osseous tissue, so that nearby and very important articulations, like the elbow, the ankle and the wrist were rendered quite useless from lack of mutual support from the bones above or below the joint, surgeons began to look for some new material or method of treatment by which to hold ununited fragments together, or to serve as a substitute for the bone lost or carried away by accident or subsequent suppuration. Consequently, bones of animals, as the sheep or the rabbit, were carefully selected and fitted in to fill the break. After much discouragement and many failures, this was given up. We might have known better from scientific reasoning, for blood cannot be transfused safely from animal to man. This was first tried centuries ago, but because of the tendency to fatal hemolysis, it too. was finally laid aside. If the human organism is not constituted to receive and utilize blood taken from animals, thereby mixing the species, naturally, heterogenous transplantation of bone would share the same fate as transfusion, for blood is essential to the life of all tissues.

Whether we are entirely familiar with the physiology of the blood or not, it is patent that if the body were deprived of the peculiar function of this complex fluid, for even a short time, bone regeneration, as well as all other reparative processes, would suffer loss. Note the far reaching results of vascular change in the aged; the depressing effect of serious hemorrhage in younger subjects. Surging along with terrific force, the blood never ceases its beneficent toil until the very heart muscle, one of its many dependencies, is held in the grip of inactivity. Everladen with reconstructive power, it lashes the stronger tissues with its constant ebb and flow, the meanwhile softly bathing the delicate brain cells which, in clever response, give out their finished products—deep thought, pleasant dreams, hopeful anticipation.

One would hardly expect that bone or muscle could long tolerate such foreign bodies as nails or screws. Doubtless, the time will soon come when the Lane plate will be used rarely. But the splendid work of Mr. Lane, in its effect upon the evolution of bone surgery, will live on. Could the Lane plate always be removed without a rather difficult secondary operation, it would be an ideal splint, for many fractures, during the stage of callus formation. Unfortunately, when the osteogenetic process has served its purpose of uniting the broken fragments, and of fusing together, in proper relation, the various layers, periosteum, endosteum and intermediate bone, the steel work, if left in, often becomes a menace to the final stage of bone regeneration. Indeed, as a proof of this, the plate may be extruded in part, or require complete removal. One thing is true, however, if a sterile small nail or screw can be so placed that it subsequently becomes well covered or encapsulated, though not essential to the part, it may never give rise to untoward symptoms. This is shown by the receptive power of the tissues after nailing in fracture of the femoral neck; and in fixation of the great trochanter, following preliminary detachment for arthroplasty of the hip joint.

All steel plates, screws, nails or wire, whether large or small, are intended only as a substitute for callus; for there is little argument to prove that, without bony union, their presence adds anything to the supporting power of the limb.

The pioneer work of the late John B. Murphy, though much criticised at times, will serve as a foundation upon which to build a more perfect system of bone surgery, for decades to come.

Having learned considerable by experiment, and quite as much by failure, we have at last reached the place where we no longer doubt the superiority of autogenous bone grafts, pegs, or inlays over all other materials. Some time has been required to

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accomplish this, but the necessary training has given us keener insight, and wider comprehension. Nature is most wonderful in preparing her devotees to master the unusual. But we must follow her leadings. Every time we deviate from that which is right and rational in surgery, though acting in the best of faith, and seek improvement in the use of cumbersome, unwieldy methods, confusion replaces order, and we find ourselves as helpless to go on as a prattling child to mend its own broken toys. But, if we are diligent, Science always comes to our rescue. Thus, in the field of surgical research, it frequently happens that, after months or years of sustained effort, we suddenly make a noticeable advance in the manner of doing things, and, immediately, the whole world is conscious of the change, and its beneficent effect upon humanity. It is because Science has shown us the more excellent way; and when she does this, we are amazed at the simplicity of that which, a few days or weeks before, seemed but an unexplorable labyrinth.

There is nothing simpler than an inlay of bone for ununited fracture, now that we know how to proceed. The graft is taken usually from the patient's tibia, measured and sawed with perfect accuracy, so that it will exactly fit the space in the defective part prepared for it by the proper instrument and with equal precision. If possible, periosteum should lie in contact with periosteum, and bone with bone. By this little device, a helpless, and often uncomely, member is made over into a useful and more desirable one. The transplant serves to fix the fragments until osteogenesis can unite them firmly together. A bone graft, not occupying the medullary canal, may live and accomplish the desired purpose, without its own periosteum. It is safer, however, to preserve the periosteum wherever possible. The controversy over this matter is well nigh settled. Generally speaking, better results may be looked for in otherwise healthy individuals. Bone may be grafted from one patient to another; but a syphilitic donor would be an unwise choice. If the patient is syphilitic and the graft autogenous, specific treatment should be instituted.

From the very beginning to the end of all bone operations, the greatest care must be exercised. The assistant and the operating room nurse should know their part. The field of operation, as well as every step in the procedure, must be thoroughly clean. The transplant is made with special reference to perfect adjustment. The bone, with its continuity restored by the graft, should not be shortened. Neither should it be rotated in relation to its fellow, or to neighboring joints. A graft or transplant should be so designed and fitted in place that it cannot move freely and thereby vary the final position of the limb. Nor must it be so tight as to favor necrosis, loosening up at a time when fixation is necessary. Aseptic blood clots and bone chips, deposited about the fragments, seem to benefit, rather than hinder, the healing process. They really are not essential. The wound is closed and dressed in such a way as to be easily reached without disturbing the limb, which, of course, is well supported by a plaster cast, extending beyond any nearby joints, the action of which might seriously alter the alignment. The *x*-ray, used before the operation, and at stated times after, will give valuable information as to whether or not the graft is slowly disintegrating. It will also determine the rapidity with which the break, or deficiency, is being filled in by new bone formation.

What has been said above, applies surgically to nearly all parts of the bony system. The work must be absolutely aseptic, and free from all unnecessary traumatism. An architectural mind and some dexterity in the use of instruments, are of much help to the operator. Above everything else, he must have a careful and intelligent assistant.

All bone surgery requires skill and aptitude. Some operators seem to have poor results with their bone cases, though they are very successful in other lines. It is much the same with any professional work. A well trained mechanic may be able, easily, to do the preliminary construction, so very necessary, for a magnificent dwelling, but is not fitted to carry out the inside finish, and he might not desire to, appreciating the monotony of it all. For, here, some one is needed who is naturally adapted to detail, and willing to spend the time required to plan and frame the delicate mitre, properly cut and bead the costly material without waste, and gracefully fashion the fresco and cornice, so that when the building is complete, there will be a quiet and perfect blending of color and form. It is no discredit to any surgeon to refer to a colleague those cases which, in his own hands, might not be satisfactory. Most of us can do some things better than others. Bone work is far from fascinating; it is even irksome at times, and, from a medico-legal standpoint, is fraught with great responsibility.

Not only has bone surgery, in a general sense, made rapid progress lately, but the work done in the realm of joints has been truly wonderful. We long have been able to practice excision of joints for tuberculous disease, with quite satisfactory re-

sults. The same may be said of chronic synovitis, in which aspiration, followed by injection of various antiseptic fluids or emulsions, has given permanent relief. Under general anesthesia, guarded manipulation has produced a fairly wide range of motion in certain cases of fibrous ankylosis. But, formerly, when confronted by bony ankylosis in those articulations, of such great importance to the wage earner, as the elbow or the knee, fearing an unsatisfactory termination, surgeons were not very anxious to attempt any radical measure. Now, however, applying the more recent methods of artificial joint formation, it is safe to promise a fair amount of service in many cases of complete ankylosis which, at one time, would have seemed useless to undertake. Such is true of the hip and inferior maxillary joints, when, from a previous arthritis, they have been rendered absolutely immobile. By restoration of function in a case of this nature, the patient's life is simply revolutionized.

The operative work is simple, but must be extremely accurate. The surgeon must be able to mobilize the ankylosed joint with safety to all surrounding structures. Having done this, it is necessary to shape the articular surfaces so that, when finished, they will not only glide freely and easily upon each other, but move in obedience to the manifold strain put upon them by the part when in active use. It is not enough that a hip joint, so treated, should sustain the patient's weight in the erect posture; but it must not dislocate during adduction and abduction, nor refuse to support the body during the complicated act of ascending and descending an inclined plane. Perhaps the greatest test of efficiency in an artificial inferior maxillary joint is chewing food. In this articulation, and in the hip and knee, reconstruction is usually required on one side only. Consequently, the remaining normal joint safeguards the newly formed one.

The preparation of the fascial and subcutaneous flap is of some moment. It should be of uniform thickness, and large enough to cover every particle of denuded bone surface. Furthermore, it must be securely fixed in position. This flap may change its character, owing to continuous friction; but appears never to suffer complete annihilation. It fully compensates for the lack of synovial fluid, permits a painless, easy motion and gives the joint that natural, spring-like resistance to shock. If too much bone is removed, in preparing for a new joint, the relaxed extra-articular structures may not be able to prevent subluxation. The joint will also be proportionally weakened thereby. If the amount of bone removed is insufficient, the tension of the surrounding parts will lead to necrosis of the interarticular flap. In that instance, there will be more or less pain and limitation of motinn, rarely ankylosis. One can do no better, in the work of new joint construction, than to imitate the natural state. Bones intended to act in the capacity of an artificial articulation, but having rough, undulating surfaces, will be a source of disappointment, both from the side of usefulness, as well as range of motion.

The after care of patients operated upon for bone lesions, is of the utmost importance. Some of them easily become discouraged, and set out to use the limb before the traumatized surfaces have recovered from the operation sufficiently to bear the more exacting strain incident to function. In this way, a callus which needed longer time for solidification, may yield; or, an interarticular transplant may become dislodged before union of its edges has taken place. Others require watching, that they do not prolong the period of rest, until atrophic and other changes take place in the muscles and nerves which, though hard to explain, very easily defeat the purpose of the operation. I have spent many long hours in conversation with individuals who, but for timely advice, would certainly have given up and spoiled an operation which, eventually, turned out to be satisfactory. Each case requires its own particular care. Some persons seem to recover from the most intricate bone operation, with very little assistance; while others, apparently against their own will, must be literally dragged through the period of convalescence. Much skilful work has resulted disastrously because, during the final days of treatment, the surgeon failed to estimate the value of personal supervision, and the rigid application of undesirable detail.

One of the smaller ailments, about which too little is said and done, is the condition known as a bunion, the location and nature of which is common knowledge. Often not large enough to appear troublesome, it may yet be so tantalizing as to give the patient continual discomfort. The pain caused by a bunion varies within the widest limits, and may be of the sharp, lancinating type, which is usually intermittent; or dull, deep seated and more or less constant in character; both types of pain are exaggerated by damp, cold weather, and by tightly fitting shoes, of social requirements, used to replace the looser one worn about the home. On the other hand, the symptoms may be irregular in all respects, coming on at a time when, considering the effects of pressure, they really should be absent. Indeed, the

tired housewife, with shoes laid aside at the close of the day, may suffer most.

A bunion, which involves the first metatarsophalangeal articulation, is commonly described as a bursitis. In reality, it is a partial dislocation, complicated by an inflamed bursa, with well marked pathological change about the head of the metatarsal bone. This definition may not be generally accepted; yet, in a large number of cases, we have found it to apply in every one. Our method of joint construction for bunion, which we think embraces some originality, is based upon a careful study of this articulation, both before and after operation.

The anatomy of the foot is familiar to every physician and surgeon; but, in this connection, several features may be referred to with profit. The foot, in some subjects, is very wide through the region of the transverse arch. If such a foot is exposed to the pressure of a pointed, narrow shoe, the large toe will be adducted, or carried outward. At first, when the shoe is removed, the toe easily returns to its normal position. After a time, however, the extensor tendon, also displaced outward, instead of making traction in the long axis of the foot, becomes shortened and, consequently, holds the toe in a state of permanent adduction. There is now a partial dislocation, which gradually increases until the great toe comes to lie under or over the second. The latter position is most common. Favoring this outward trend of the first toe, is the normal action of the muscles. During the process of walking, the toes are raised and adducted before the foot leaves the floor. This is true of every attempt to change the foot from place to place, and is easily recognized, even with the shoe on. Any abnormal crowding of the large toe against its fellow, therefore, must be greatly exaggerated by this frequent and very necessary pull.

The articular surface of the head of the metatarsal bone is more extensive than that covering the base of the first phalanx, so that a very slight deviation of the toe outward, exposes the articular substance to pressure greater than that which it was designed to have; the result is a proliferating osteitis. This process often goes on until the cauliflower excrescence of bone protudes through the skin. In that event, a bursitis would be quite impossible, since the bursal sac is either punctured or destroyed altogether.

A person with short toes is rarely troubled with bunions, the foot being more massive throughout, and less receptive to injury. When the second toe is longer than the first, all the toes are usually long, and the foot correspondingly slender. These, more than any other type of feet are subject to bunions. A few cases are found among persons who have never worn tight shoes nor shoes unduly loose; neither do they recall having had any injury or inflammation in the region of this joint. No real cause therefor, can be ascribed here. One is inclined to believe that a small number of patients develop bunions, like arthritis deformans, without any well qualified etiology. I have purposely omitted several of the causes of the condition under discussion, commonly mentioned in the text books, on account of their unimportance. Lastly, there is some reason to conclude that bunions may be hereditary.

An intermittent and very painful bursitis is, of course, possible; but it usually improves under palliative measures. When a true bunion can be diagnosed, however, it is useless to temporize, and a radical operation should be performed, if the patient's general condition will permit. Such a course will reduce the suffering and greatly increase earning power.

The diagnosis of bunion should be made with certainty, for if the real condition is absent, and the patient is operated upon, the most skilful procedure is likely to be followed by pain and disappointment. The patient's story is of paramount importance. The surgeon is expected to cure the complaint uppermost in her mind. It may be severe pain, or a mild form of distress. Sometimes, there is a desire on the part of the individual merely to improve the appearance of the foot. This is honorable, and well worth while. Quite, often, however, the patient has suffered a long time, and wants relief. Both feet may be equally distorted, but, invariably, one is more painful than the other. Most cases are bilateral, and should be cared for under one anesthesia. And this is a point of much interest, as is allows the surgeon, while at work, to compare the two sides with the idea of symmetry; for it follows that, not infrequently, patients have been partial in their criticism, after a two stage operation, expressing regret that both conditions were not relieved simultaneously.

In the beginning of bunion surgery, we had fairly good results, but the work was crude and unscientific. Heavy forceps were used to clip off the head of the metatarsal bone, often fracturing the shaft, and leaving small fragments to interfere with joint motion. After insertion of the subcutaneous flap, many times without careful regard as to whether it entirely covered the articular ends of the bone, the wound was closed. Extensive resection, too, often

left so much space between the bones that an interarticular substance was really unnecessary. And the appearance of the foot when healing was complete, left no doubt as to the defective work done within. Now that new and better instruments have been devised for shaping the joint surfaces, the ultimate outcome of bunion surgery, as it is carried on at the present time, may be looked upon as both curative and cosmetic.

If possible, the inner aspect of the outer wall of the joint should never be injured, during the reconstructive process, because of the liability to postoperative neuralgia along the anterior tibial nerve, which supplies this region, sending a small twig to the articulation itself. The pain is referred to the interdigital space. The sesamoid bones are left undisturbed. They serve as a protection to the newly formed joint below, and help to strengthen the transverse arch.

In some instances, after operation, the large toe will tend to rest slightly above the floor level. Though a small matter, it may greatly annoy the patient. The difficulty is to be overcome by advancement of the extensor tendon, just before closing the original wound. If the tendon is completely severed, and left so, the toe will dip somewhat, and interfere with the natural gait in walking. The tendency for the great toe to resume the old habit of adduction, is always to be anticipated. This cannot occur, if some special instrument is used to shape the head of the bone, and the utmost care exercised is completely closing the joint. Joint closure is an essential element to perfect function, and is provided for during dissection of the transplant, as indicated later. The bursal sac may, by chance, form a part of the interarticular structure: a help, rather than a hindrance, for many of the characteristics of the bursa are likely to be developed in all artificial articulations, if the bones project into a closed cavity, are smooth and properly shaped, and separated by an adequate amount of subcutaneous tissue. The skin flap is made narrow so as to avoid the tendon sheaths above and below, and to place the scar over the area of least friction, namely, the inner side of the foot. The horizontal flap will be found much superior to the vertical, in many respects, and is amply supplied with blood. The patient should always be informed that a bunion operation, to accomplish the desired result, necessarily shortens the toe. Very little, however, if the more recent methods are employed, thereby conserving the bone in length. As a safeguard against infection, the entire preparation of the foot should be repeated, three to six hours before etherization.

A linear shaped skin flap, rounded in front, with base posterior, is first turned back, beginning slightly beyond the line of articulation. Next, an area of subcutaneous tissue, similar in shape, with base anterior, and large enough to fully line the proposed joint, is carefully carved out, so as to avoid the underlying structures. On reaching the joint, it is desirable to leave a collar of fascia, extending around the exposed inner portion of the neck of the metatarsal bone. The joint is then opened, and a part of the head of the bone removed with a Gigli saw. The reamer is now applied at various angles, until all superfluous bone is removed, smoothing and rounding the head in a most artistic manner, back to the ring of fascia, previously referred to. The depression in the base of the phalnax may sometimes need to be deepened to receive the newly formed head. At this juncture, the subcutaneous flap is carried into the joint, and fixed with fine catgut, so that the bony surfaces will always remain effectually separated from each other. The collar of fascia, already described, is now stitched, under considerable tension, to the interarticular structure, along the line at which it curves to enter the joint cavity. This completely closes the articulation, and serves as a check ligament against future adduction of the toe. The wound is closed without drainage. If infection should arise, there will be limitation of joint action.

After the third day, gentle passive motion is begun, and continued daily until healing is completed and satisfactory. The patient may be up in ten days; wear a soft shoe four days later; and resume her usual activities in five to six weeks. Not until several months have elapsed, however, will the entire foot come into possession of its former elasticity.

Arthroplasty for bunion is one of the most delicate operations the surgeon is called upon to perform. It presupposes a clear conception of all the active principles entering into the normal articulation, as well as the one which is to take its place. And, when properly done, it will so transform the appearance of these unsightly extremities, as to call forth unsolicited comment from the most casual observer.

THE ARMY SURGEON.

The army medical officer, like the sailor, must be a handy man. It is not enough that he is able to treat disease and wounds after the most modern and approved methods, but he must be fully competent as a sanitarian and hygienist. Now that so many civil medical practitioners have taken military positions the need for including training in sanitation and hygiene in the medical curriculum has been amply demonstrated.—*The Medical Record.*

HELIOTHERAPY IN THE CURE OF DIDEASES OF THE BONES AND JOINTS. REPORT OF ONE HUNDRED AND TWENTY-SEVEN PATIENTS.

WILLIS C. CAMPBELL, M. D., F. A. C. S.
Professor Orthopedic Surgery, University of Tennessee; Fellow American Orthopedic Association; Orthopedic Surgeon to the Memphis General Hospital, etc.
MEMPHIS, TENNESSEE.

The sun as a therapeutic agent was used by the ancients, and for centuries mention of this measure may be found in medical literature. Various savage tribes and animals, notably the dog, seem to divine the beneficial action of the sun light, exposing their bodies when ill to the direct solar rays.

The exposure of a part of the body, effected by disease, "local heliotherapy", has been employed with some degree of success, for many years in the treatment of various disorders of the skin and bones, but the systematic and scientific dosage to the entire body, "General Heliotherapy", is a comparatively new method, evolved and perfected by Rollier of Loysen, Switzerland, to whom full credit should be given. General heliotherapy, in contra-distinction to local heliotherapy, is of paramount interest at the present time on account of the number of "war wounds" amenable to the solar treatment. In fact the measure is now being employed in many of the military hospitals of France, notably the American Hospital, from which excellent results have been reported.

Downs and Blount in 1877 proved the antiseptic action of sunlight. The following year, (1878) Downs and T. P. Hunt showed that the bacteriacidal action of the sunlight was materially inhibited unless in the presence of free oxygen. However, sufficient evidence as to how the rays act as a curative agent in disease has not been produced and at present the evidence must be regarded as purely empirical.

Bernhard of Somaden, Switzerland (1,700 meters above sea level) noticed that the farmers hung their meats out in the sun to dry, and used this antiseptic drying method for living tissues in his sanatarium in 1902, and was the first to consider altitude of special advantage in local heliotherapy. Rollier, encouraged by Bernhard, established his present institution at Leysin in 1903. He now has three sanataria at different altitudes, 1250, 1350 and 1510 meters above sea level respectively.

Rollier believes that all surgical tuberculosis is a general infection with local manifestations for which he exposes the entire body from three to seven hours daily. He regards the ultra violet or actinic-rays as the curative agent, and calls attention to the fact that all parts of the spectrum (red, orange, yellow, green, blue, indigo and violet and the invisible spectrum ultra red and ultra violet) are more intense at high altitudes, and that seasonal variations in the width of the spectrum are not marked as in the lowlands. Such variations he regards as due to the formation of ammonia and nitrous compounds in the atmosphere from electrical phenomena, especially during the warmer months, which contracts the invisible spectra, (ultra red and ultra violet,) thus decreasing the effect of solar rays in summer, while in winter there are few sunny days in low countries, and the cold damp atmosphere, with excessive wind currents, does not permit general exposure. On the other hand at high altitudes there is less seasonable variation in the spectrum, more sunny days, and the air is pure, still and dry, permitting almost continuous insolation. De Quervain, Hussy, Bardenhauer, Witmar and Hirschberg concur with Rollier. On the other hand A. Treves, Barbarin, D'Oelnitz, Audion, S. Koffman, Jerusalem and others, consider heliotherapy equally effective in the lowlands. Rollier, however, admits that cures may be effected in the lowlands, but regards altitude of decided advantage. Apparently, with the exception of Bardenhauer who resides in Cologne, a rather cold damp climate, the point of view regarding altitude depends on the local habits of the individual observer.

My work extends over five years and has been conducted at Memphis, Tennessee, practically sea level, not influenced by sea shore or by altitude. The results obtained among the tuberculous were so encouraging that the method was extended to various other affections of bones and joints with marked success.

The administration of the solar rays is by no means a simple task, especially in private practice. The closest scrutiny is necessary at all times or the treatment will rarely if ever be carried to a successful termination. I have seen many failures resulting from a lack of appreciation of the importance of employing the measure in a scientific and rigid manner. Dosage and the reaction on the part of the skin and the general condition of the patient must be observed constantly. In treating syphilis we would not expect to obtain cures by presenting a patient with a mass of mercurial ointment and giving instructions to rub, nor would we expect curative action of the solar ray by bidding our patient to go out in the sun with the instruction "expose yourself as much as possible." Each case must receive detailed instructions as to length of time, the

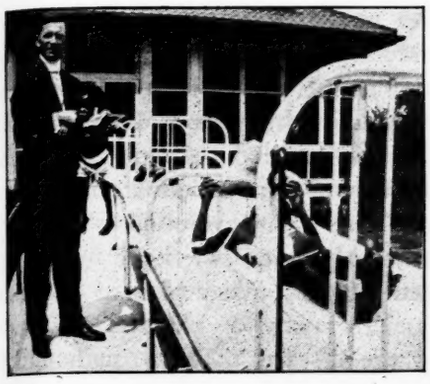

Fig. 1—Heliotherapy in negro children at the Memphis General Hospital.

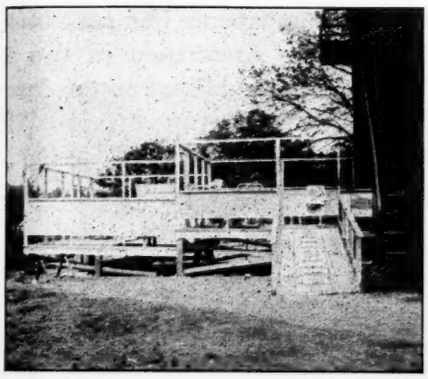

Fig. 2—Inexpensive pavilion at private hospital to accommodate 15 to 20 patients.

Fig. 3—Rollier position in private patient with sinuses, treated successfully in private home

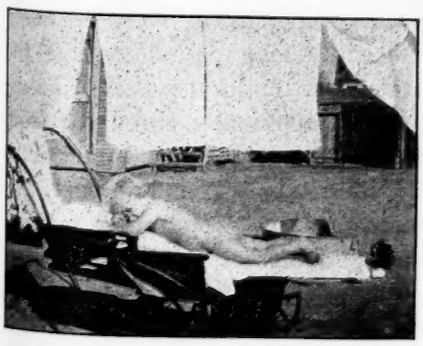

Fig. 4—Mid-dorsal tuberculosis after one year's treatment in private home in crowded city district.

Fig. 5—Showing spine cases at one of the local institutions.

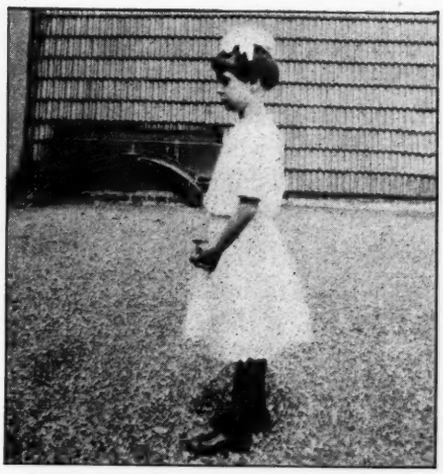

Fig. 6—High cervical tuberculosis. Treatment, six months. No recurrence at the end of 12 months.

Fig. 7—Tuberculosis of right knee, two years' duration.

Fig. 9—Extreme emaciation with multiple sinuses in lumbar tuberculosis.

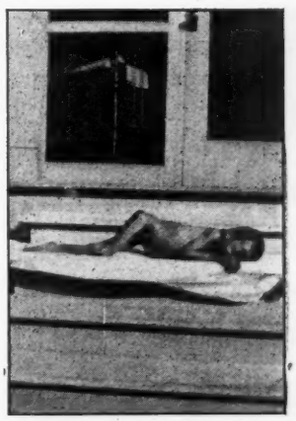

Fig. 10—Showing double psoas contraction.

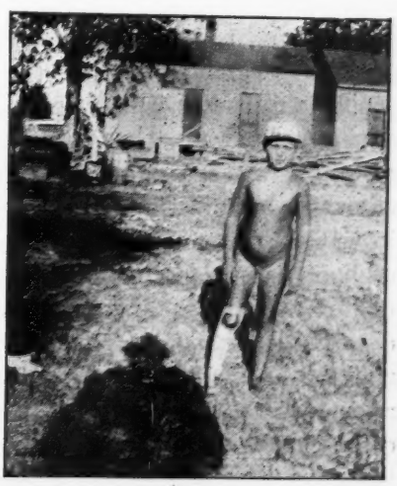

Fig. 8—After six months' heliotherapy. Note intense pigmentation.

HELIOTHERAPY IN THE CURE OF DISEASES OF THE BONES AND JOINTS. REPORT OF ONE HUNDRED AND TWENTY-SEVEN PATIENTS.

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Downs and Blount in 1877 proved the antiseptic action of sunlight. The following year, (1878) Downs and T. P. Hunt showed that the bacteriacidal action of the sunlight was materially inhibited unless in the presence of free oxygen. However, sufficient evidence as to how the rays act as a curative agent in disease has not been produced and at present the evidence must be regarded as purely empirical.

Bernhard of Somaden, Switzerland (1,700 meters above sea level) noticed that the farmers hung their meats out in the sun to dry, and used this antiseptic drying method for living tissues in his sanatarium in 1902, and was the first to consider altitude of special advantage in local heliotherapy. Rollier, encouraged by Bernhard, established his present institution at Leysin in 1903. He now has three sanataria at different altitudes, 1250, 1350 and 1510 meters above sea level respectively.

Rollier believes that all surgical tuberculosis is a general infection with local manifestations for which he exposes the entire body from three to seven hours daily. He regards the ultra violet or actinic-rays as the curative agent, and calls attention to the fact that all parts of the spectrum (red, orange, yellow, green, blue, indigo and violet and the invisible spectrum ultra red and ultra violet) are more intense at high altitudes, and that seasonal variations in the width of the spectrum are not marked as in the lowlands. Such variations he regards as due to the formation of ammonia and nitrous compounds in the atmosphere from electrical phenomena, especially during the warmer months, which contracts the invisible spectra, (ultra red and ultra violet,) thus decreasing the effect of solar rays in summer, while in winter there are few sunny days in low countries, and the cold damp atmosphere, with excessive wind currents, does not permit general exposure. On the other hand at high altitudes there is less seasonable variation in the spectrum, more sunny days, and the air is pure, still and dry, permitting almost continuous insolation. De Quervain, Hussy, Bardenhauer, Witmar and Hirschberg concur with Rollier. On the other hand A. Treves, Barbarin, D'Oelnitz, Audion, S. Koffman, Jerusalem and others, consider heliotherapy equally effective in the lowlands. Rollier, however, admits that cures may be effected in the lowlands, but regards altitude of decided advantage. Apparently, with the exception of Bardenhauer who resides in Cologne, a rather cold damp climate, the point of view regarding altitude depends on the local habits of the individual observer.

My work extends over five years and has been conducted at Memphis, Tennessee, practically sea level, not influenced by sea shore or by altitude. The results obtained among the tuberculous were so encouraging that the method was extended to various other affections of bones and joints with marked success.

The administration of the solar rays is by no means a simple task, especially in private practice. The closest scrutiny is necessary at all times or the treatment will rarely if ever be carried to a successful termination. I have seen many failures resulting from a lack of appreciation of the importance of employing the measure in a scientific and rigid manner. Dosage and the reaction on the part of the skin and the general condition of the patient must be observed constantly. In treating syphilis we would not expect to obtain cures by presenting a patient with a mass of mercurial ointment and giving instructions to rub, nor would we expect curative action of the solar ray by bidding our patient to go out in the sun with the instruction "expose yourself as much as possible." Each case must receive detailed instructions as to length of time, the

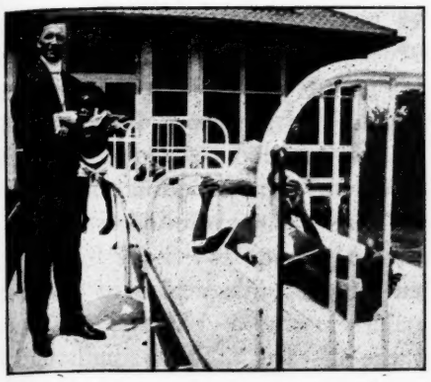

Fig. 1—Heliotherapy in negro children at the Memphis General Hospital.

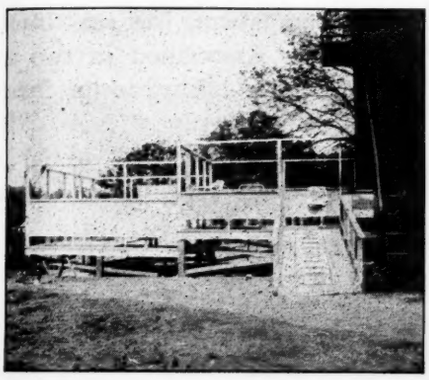

Fig. 2—Inexpensive pavilion at private hospital to accommodate 15 to 20 patients.

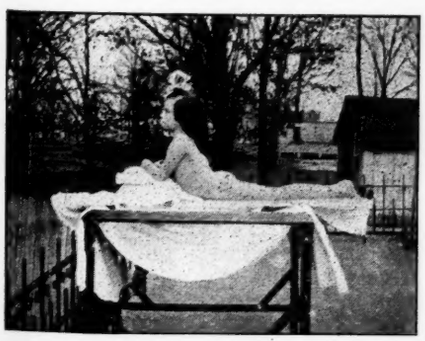

Fig. 3—Rollier position in private patient with sinuses, treated successfully in private home

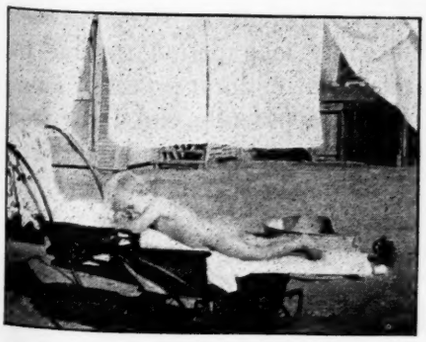

Fig. 4—Mid-dorsal tuberculosis after one year's treatment in private home in crowded city district.

Fig. 5—Showing spine cases at one of the local institutions.

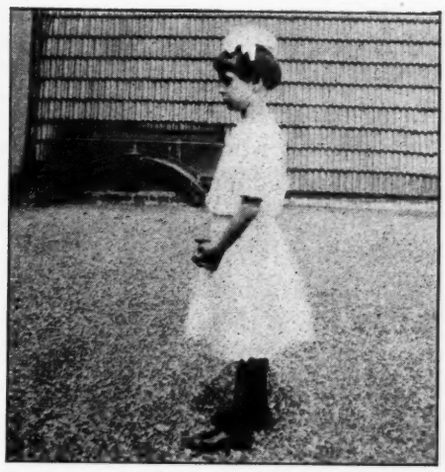

Fig. 6—High cervical tuberculosis. Treatment, six months. No recurrence at the end of 12 months.

Fig. 7—Tuberculosis of right knee, two years' duration.

Fig. 9—Extreme emaciation with multiple sinuses in lumbar tuberculosis.

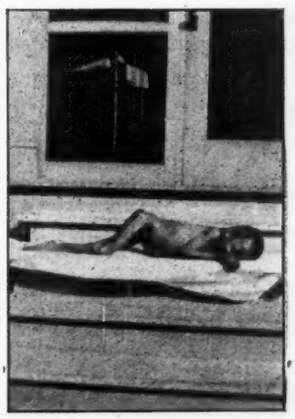

Fig. 10—Showing double psoas contraction.

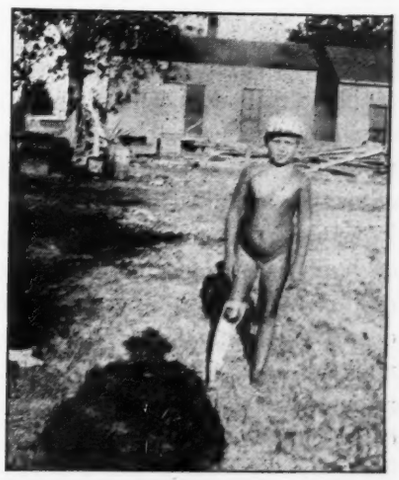

Fig. 8—After six months' heliotherapy. Note intense pigmentation.

amount of body surface, etc. The greatest care must be taken to avoid dermatitis. The effect on the hemoglobin, white and red cells should be noted *x*-ray examinations must be made at intervals. The correct dosage for each patient should be worked out by experience. Some can stand frequent exposures for short intervals, others continuous exposure. Many are seriously affected by the midday sun, while some do well, regardless of the heat.

About five years ago, I became interested in heliotherapy, and first used the method on an apparently hopeless tuberculous spine and hip joint in an adult, with such a rapid and remarkable cure that I at once instituted the solar treatment in the orthopedic service of several local hospitals. Since which time I have been convinced that the beneficial effect on the diseased process is chiefly due to the action of the sun's rays on the skin surface of the entire body, for there is no comparison in the local and general improvement of patients simply living out of doors in the fresh air and sunshine and those on whom systematic heliotherapy has been properly administered.

A careful observation of the clinical course is most interesting; no material improvement is noted until pigmentation is well established, after which there is an increase in appetite, a decrease in temperature, the red blood cells and hemoglobin are rapidly increased, and also the body weight. The entire clinical picture may change within a very few weeks. In patients with fistulae the discharge becomes more copious, and after a few days thinner, then gradually serous and scant, finally healing in from three to six months. It has been my experience that ankylosis occurs when there has been well marked disintegration of bone, otherwise a normal joint is possible and was the result in several of my cases. Deformity can only be overcome or prevented by orthopedic measures, which should be rigidly employed in every case. The *x*-ray findings are most interesting, and are the most efficient guide, after clinical symptoms have subsided. One will notice in a well advanced tuberculous spine a destruction of bone as evidenced by wedging of the vertebrae, obliteration of the inter-vertebral disks, or total destruction with telescoping. The lamellae are vague and the bone thin and atrophic. Surrounding the affected area, especially in the dorsal region there often can be seen a rounded or spindle shaped inflamatory exudate. After a few months of insolation there is material change. Evolution of the process is evidently hastened, necrosed areas are being absorbed, the bone becomes more opaque, and by the end of six months is often thicker than normal, and apparently ankylosed. The inflammatory exudate becomes irregular, thinner, gradually diminishing in circumference, or at times undergoes calcification. In joints the process is analogous. One often will be surprised to see rapid destruction of joint surfaces after a few months exposure to the sun, when for a year or more little material change had been noted. This rapid evolution is probably due to the removal of devitalized tissue by natural forces stimulated by the tonic action of the sun, which in my earlier experience I deemed an acute exacerbation of the disease. These pathological changes shown by the *x*-ray also are evident in septic cases with sinuses, as above described.

A full discussion of the literature and the complete histories of fifty-one patients was read before the American Orthopedic Association in two articles (1915-1916) and later published in the American Journal of Orthopedic Surgery. (April 1916, Vol. XIV No. 4, January 1917, XV No. 1.) to which reference can be made for further detailed information.

FIG. 11—After three months' heliotherapy.

I have employed heliotherapy for one hundred and twenty-seven patients with affections of the bones and joints; eighty-seven were tuberculous; twenty chronic infectious osteomyelitis and twenty miscellaneous disorders.

Of the eighty-seven tuberculous, sixty-five were treated for a sufficiently long period to note the effect of the treatment on the local process. Twenty-eight have remained apparently cured for from one to five years. The lesions were localized as follows: Spine 13, hips 9, knee 5 and ankle 1, and eleven were accompanied by suppurating fistulae. Three had fluctuating abscesses, which were absorbed. Of the 65, twenty-five had open fistulae, fifteen of which became entirely healed. Four are healing rapidly at the present time, while two adults over 40 years of age have presistent lesions after two

years of intensive treatment. Eighteen to twenty-eight of the apparently cured were exposed for from six to nine months. Not one of the twenty-eight have continued treatment over two years. Of the twenty-one now under treatment only the two adults above mentioned with discharging sinuses, are improved, but not cured—the remaining nineteen show every evidence of an eventual excellent result.

Eleven could not be controlled for a sufficient length of time to effect a cure, but showed decided improvement.

Twenty were adults, six of whom are reported as cured, seven have improved and remain under treatment, two improved but did not continue treatment. Five adults with vertebral infections

Apparently Cured. T. B. Knee After 6 Mos. Heliotherapy, Showing Degree of Painless Flexion.

Apparently Cured. T. B. Knee After 6 Mos. Heliotherapy, Showing Normal Extension.

died, four directly or indirectly from the primary infection and one of an intercurrent disorder.

To summarize: twenty-eight were apparently cured; eleven improved but discontinued treatment; twenty-one now under treatment are improved; five adults have died; no deaths in one of the forty-five children.

Heliotherapy has been tried on twenty-one persons with chronic infectious osteomyelitis, following radical operation for the removal of sequestra. In eight instances insufficient time has elapsed to give results. Of the remaining thirteen twelve have been apparently cured for from one to four years. In one patient a double infection—left femur and right tibia—a small sinus remains in the femur after two years treatment and may require a second operation.

Second or third operations are often necessary with the present methods of managing osteomyelitis, but these have been avoided so far in twelve out of thirteen patients.

Of the twenty miscellaneous conditions, seven had intense general sepsis; in these the primary foci were in the bones and joints, but were not relieved by drainage. Heliotherapy was not given until all other measures failed and the condition of the patient was exceedingly grave. All responded favorably. Of the remaining thirteen, ten were non-tuberculous infections with pus and sinuses, which had persisted for months or years but perfect healing resulted after thorough insolation. These are analogous to many war injuries in which the bones, joints, or cellular tissues are involved. Under such conditions heliotherapy would undoubtedly conserve much tissue; often restore the injured parts to normal or put them in satisfactory condition for future operative surgery. In fact, most favorable results have been reported as stated above. In special institutions for the purpose, much undoubtedly could be accomplished in the way of military surgery at the present time, as the method must be carried out under most rigid discipline in order to effect the desired results.

Heliotherapy is far reaching in its effects and undoubtedly will be found of great value, not only in the treatment of affections of bones and joints, but for the cure of various disorders elsewhere in the body.

PREVENTIVE MEDICINE

"International Peace will be greatly aided in the future by preventive medicine" is a declaration made by President Emeritus Eliot of Harvard University. Dr. Eliot further said: "Preventive medicine is capable in the future of doing away with poverty and misery, of remedying industrial disputes, and of contributing to the cause of international peace." The medical practitioner of the future, he declared, would be one who prevented disease rather than cured. More than half the physicians of the country, he believes, will eventually be engaged in preventive rather than curative medicine. We may well add to the above that preventive medicine, and it alone, can control the insane and feeble-minded conditions, for it may be emphatically stated that insanity and moral problems cannot be solved by building hospitals, prisons and reformatories. It is also true that the highest and noblest form of charity is the prevention of poverty and immorality. Relief and amelioration are necessary because prevention is not practiced. Let us reorganize most of our charity and relief societies into prevention societies.—*Monthly Bulletin of the Indiana State Board of Health.*

SANITATION IN RELATION TO SURGERY.*

JOHN W. LE SEUR, M. D.
BATAVIA, N. Y.

At a time when the world's thought is centered on the world-wide war any topic relating to the conservation of human life is worthy the attention of all thoughtful persons. Sanitation has a most intimate relation to the welfare of the soldier, and it is fortunate that within the last decade so much attention has been given to sanitation that the valuable results obtained are available for the benefit of the soldiers.

It will be readily admitted that the prime requirements for efficiency in the soldier is a sound physical condition, and wherever surgery in any of its branches is required for the soldier the work of the surgeon is made easier and the results of his work are more satisfactory in proportion as the subject is in good sanitary condition. Hence sanitation in its relation to surgery may be said, first, to relate to the selection of men who are to serve as soldiers. Here, of course, the age of the soldier comes at once before us for consideration, and it has been definitely decided that the young and the vigorous shall be called first to this important service, but age alone is not a decisive factor. Adequate provision is made for the sanitary examination of the soldier, and his physical development, his general health and vigor, must be ascertained before he is admitted to the ranks, and the sanitary care which he has received in his youth has a direct relation to his availability when called to this important service. Sanitation goes still farther in some cases and even considers the psychological condition of the would-be-soldier. But this is aside from our main purpose and need not be further considered here.

When sound men have been selected for service, the next step is the training of these men for their work, and here too sanitation has its mission, as the education of the soldier-to-be must necessarily include such a knowledge of sanitary science as will enable him to know what to do and what not to do, and how to recognize and fight dangers to his health and to keep himself at his best under all circumstances. Certain sanitary knowledge is essential in order to maintain his power of resistance at the highest point and to enable him to endure a hard life as a sound soldier. His constant drill, and the care of his body after vigorous exercise must constantly have in view the sanitary care of the body and the development of a vigorous physique and a mental attitude which will enable him to perform cheerfully and successfully the duties for which he enlists. Having trained young men along the lines of sanitary development and care we have prepared the best possible material for such surgical work as is inevitable in actual conflict.

Sanitation has a direct relation to surgery in the care of soldiers. This is true when on the march, at rest, or even in the enjoyment of recreation. Especial sanitary instruction must be given to soldiers on the march lest in a thoughtless moment they drink water that may have been contaminated, or waste the water supply which the canteen holds or use it unwisely at the beginning of the day's march and so suffer before the day is ended. The sanitary care of men at rest is also of the greatest importance in order that they may know the necessity of adhering to suitable sanitary regulations in the strictest manner in order to protect themselves and others. Soldiers at rest, particularly those who may have been exposed to cold or wet, require special care and intelligent aid in order to avoid becoming sources of infection to others. Even the recreation of the soldier must constantly have in mind the sanitary requirements of camp life in order to furnish the best field for the work of the surgeon when that work becomes necessary. Again, the treatment of wounds in modern warfare calls for the best results of sanitary science. Here the bacteriological work which modern sanitation has enriched is proving to be of the highest value in the surgery of war.

In a recent article entitled "Bacteriology and the War," by Dr. David John Davis, this statement is made: "The relation of bacteriology and war is a reciprocal one, which the study of bacteria has most fundamentally effected the success and the methods of procedure in military campaigns. In turn, there is presented to the bacteriologist for solution many new problems of vital interest to the science; not only are new fields for investigation opened up by the war, but military organization furnishes a field for observation and confirmation of existing data on a scale and under conditions not usually possible in civil life."

During war the destruction of life by disease-producing germs *often,* indeed *usually* in the past, exceeds the destruction of life by bullets. Germ life develops so rapidly in the wounds of the soldier that the utmost care and the most strenuous efforts are called for to secure the most favorable sanitary condition for the wounded, and it is here that cleanliness, as far as it is possible to secure it,

* Read before the New York and New England Association of Railway Surgeons, November 8th, 1917.

is of the greatest value; the securing of the most favorable sanitary environment of the wounded is of the highest importance. Whether the treatment shall be prompt and bold incision, or the application of the chloramines, or the use of Benzol derivative known as Flavine, it is certain that in any and every case the more thorough the sanitary care which precedes the injury, and the more thoroughly antiseptic the treatment secured, the better the surgical results to be expected. The very important work which has been done by sanitarians, in the effort to discover the method of transmission of those diseases which are most destructive in civil as well as in military life, enables the surgeon to approach his work with more comprehensive knowledge and with greater confidence than ever before. The magnificent work which has been accomplished by the investigators and discoverers along the line of the prevention of the transmission of diseases, especially such diseases as yellow fever, typhoid fever, the so-called modern trench fever, has made the surgical work of the army officer vastly safer and more satisfactory. If we recall the sanitary work which has been done in the prevention of the transmission of diseases from army latrines to camp hospitals, we cannot fail to be impressed with the important relations which exist between modern sanitation and modern surgery. The exclusion of flies from the camp hospital, and the prevention of their liberal distribution of infection is a striking instance of the direct relation which exists between sanitation and surgery. Instances might be multiplied where lives have been and are saved by sanitary knowledge and its scientific use in the surgery of civil life as well as in the surgery of war.

All the time, and thought, and expense which have been devoted to the development of sanitary science have played a significant part in the preparation which has been made for successful war surgery, and we may take a just and a reasonable pride in the results that have followed the work of our greatest sanitarians in paving the way for successful surgery.

FIT OR UNFIT.

More and more we of today are coming to realize that crime, vice, drink, and poverty are due to mental unfitness on the part of the individual to cope with the world. As the years go by, society is requiring more and more of the individual—in making it increasingly difficult for him to keep his place in the struggle for existence. More and more complex are the conditions to which he must react, and his adaptability must increase accordingly, else he falls behind, fails "to keep up his end," and goes to a lower scale in the social standard.—L. E. DUVALL, M. D., *in The Medical Record.*

A SIMPLE METHOD OF ESTIMATING THE INDIGO-CARMINE OUTPUT.

JOSEPH H. SCHRUP, M. D.
DUBUQUE, IA.

After collecting the urine for a specified time, as in the Phenolnepthalein test, the quantity obtained is diluted to one liter.

An amount of Indigo-Carmine equal to that used in the test is disolved in ordinary water and diluted to one liter. An undiluted portion of this makes a 100% control; one-half strength, 50%; one-third, 33%; one-fourth, 25%; etc. If one wishes to check up on the Phenolnepthalein test only, it is necessary to make up only the corresponding dilution. Test tubes or bottles of the same diameter are required for both the control and the specimen to be tested. A ground-glass back-ground is not required, but is advantageous.

I have found that the control dilutions, thus made, up do not keep. This is probably due to a lack of knowledge of the proper solvent, as of late (1) an Indigo-Carmine apparatus has been put on the market.

It suggests itself that this same principle of dilution and control can also be used in a colorimetric determination of other substances (2).

1—Thomas and Birdsall: Comparative Results of Various Functional Kidney Tests, The Journal A. M. A., Nov. 24, 1917, p. 1748.
2—Peebles and Lewis: A Simple and Accurate Colorimeter for Clinical Use, The Journal A. M. A., Mch. 9, 1918, p. 680.

A BADGE OF HONOR.

A Liberty Loan button is a badge of honor. Rightfully obtained, it marks the wearer as one who has performed a distinct, definite service to the country.

Not all can fight, not all can work directly for the Government; but in buying a Liberty Loan Bond or War Savings Stamps every American renders some service to the Nation. It has been put within the reach and power of every citizen to aid the United States financially; it is a poor American who withholds support from the Government, from our soldiers and sailors fronting death on battlefields and oceans.

Iron crosses to German soldiers and diamond orders exchanged between Turkish and German sovereigns may be but the honors of atrocity. But a Liberty Loan button, simple as it is, signifies a patriotic duty done and is an insignia of honor.—*Treasury Department; Bureau of Publicity.*

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WALTER M. BRICKNER, M.D., F.A.C.S., Editor

NEW YORK, JULY, 1918.

BRAIN SURGERY AT THE FRONT.

In view of the enormous frequency of brain injury during the present war, it seems strange that so few intensive studies have appeared in print. Statistical and casuistic data are common enough, but no one, it appears, has attempted to do anything for such injuries except along conventional lines. It is for this reason, that a recent paper by Harvey Cushing is of especial interest. Cushing's succinct article based upon the observation of 225 cases, teems with original ideas.

Cushing modestly admits that his experiences in brain surgery in civil practice, in which he dealt almost entirely with non-infectious cases, rendered him in a measure inadequately equipped for the kind of work he set out to do. The methods he has evolved, therefore, as evidenced by a reduction of the mortality from 54.5% (the generally accepted mortality) during the first month of his service to 28.8% during the last month, speak eloquently for Cushing's resourcefulness and originality.

First of all he insists upon the very great value of a preliminary neurological examination. This is important to determine how far paralyses are due to the trauma or to the operation; furthermore it may help one to decide whether the opening of an intact dura is justifiable or not, or whether a secondary operation for presumptive brain abcess is necessary.

Stereoscopic radiograms are obviously necessary in every case for the detection of missiles and penetrating pieces of cranium.

Cushing insists upon the necessity of shaving the entire scalp. He decries the use of such antiseptics as iodine or picric acid which are apt to leave behind scaly or encrusted epithelium. He prefers alcohol and bichloride.

The first important novelty that one meets with in Cushing's report is in regard to the anesthetic. He has been converted completely from his advocacy of inhalation anesthesia, and now regards local anesthesia as a prime advantage in brain surgery. A general anesthetic increases intracranial tension; it provokes bleeding from the scalp; it encourages the use of rougher methods, and especially speed "which is to be decried at the expense of delicacy." Moreover it promotes post-operative respiratory difficulties.

The plotting of the incision is important; flap incisions are sometimes feasible but for the ragged or gutter defects of the vault the tripod or three-legged incisions are most applicable.

The second novel recommendation is "trepanation en bloc." Cushing believes that the conventional method of excising a depressed fracture by the rongeur is bad, because the operator must work through an infected field, moreover, it entails an amount of trauma that the patient will not tolerate. Cushing encircles the depressed area with numerous punctures made by a burr, and connects these with a linear cut. The whole of the depressed fracture and the overlying infected scalp is then removed in one piece.

Cushing again offers novel suggestions in regard to the treatment of the wound track. This indeed is the most important step in the operation. Hitherto surgeons have advocated the use of the finger to explore such tracks. Cushing holds that such exploration is frequently disastrous because it causes greater trauma and drives loosened fragments of bone more deeply into the brain. He advises therefore a soft rubber flexible catheter, which can be driven into the smallest opening and is as delicate for determining missiles or fragments of bone as the finger. By attaching a glass syringe with a rubber bulb, the softened traumatized brain can be sucked out, and frequently as well, small bits of bone or missile.

Cushing advocates extreme conservatism in opening the dura. It should only be undertaken in cases where the neurological examination reveals local loss of function or in which the exposed dura is

tense and evidently overlies a clot or a severely contused area.

The removal of missiles should not be accomplished if such a removal involves increasing the damage already done. Once more, Cushing makes an original suggestion. He has found that the magnet removes missiles more surely and with less trauma than by any other method; indeed he regards it as the only justifiable method to remove deep seated magnetizable bodies from the brain. This method, in his view, is capable of wide possibilities.

Finally, Cushing regards the use of dichloramine-T dissolved in eucalyptus oil as one of the largest contributing factors in the reduction of his mortality. In not a few cases, in which the wound and bone fragments showed an abundant bacteriological growth, no infection occurred despite complete closure of the wound, after this antiseptic was employed. The antiseptic is injected in the pathway of the missile and just before closure of the scalp, the dural surface is moistened with this solution.

Few surgical papers written during this war have revealed a larger message or a more practical sense of the relation of brain surgery to general progress under war conditions.—E. M.

THE PROBLEM OF THE DISABLED.

The Great War is a war of nations in which the entire manhood is engaged. Very soon we, too, shall have seriously large numbers of wounded, of whom a few will be crippled in mind, and many, many more will be crippled in body. The problem of the disabled looms large on the horizon, much larger by far than in any previous war, and bids us prepare.

There will be men without arms and men without legs, and men whose limbs are distorted, as a result of frightful wounds, out of all human resemblance, and are useless, apparently, for any remunerative task. All of these will need care, care which will not result in large numbers of helpless dependents, but in wage earners, independent of charity or pension. The experiences of our British allies, in the handling of this problem as detailed by Colonel Sir Robert Jones, are very valuable. (American Journal Orthopedic Surgery, May, 1918.)

Fully fifty per cent. of the wounded have injuries which require for their proper care orthopedic principles and methods; these may be preventive or corrective. Unfortunately, with the character of the wounds which are seen, the initial sepsis is so violent as to force the concentration of one's attention on the conquest of the infection. The bulk of the orthopedic work will, therefore, be corrective and will be carried out at a comparatively late period at bases far back of the firing line. Early evacuation from the casualty stations should be encouraged and the proper cases should be immediately congregated in "orthopedic centres".

The reconstruction of the cripple is a very large work and will demand the close cooperation of the official agencies as well as of the many voluntary institutions already in existence. It is important that each centre be properly and completely outfitted; that the surgeons be properly trained and full of enthusiasm; and that all the departments, and especially those for massage, electro-therapy and manual exercises, be in charge of a competent directorate for the purpose of securing a proper subordination and coordination of all. The restoration will consume much time,—six months, a year, perhaps longer; in that time there may be need of the services of many or all departments,—a desideratum much better accomplished under one roof.

Two factors largely influence the morals of these centres; first, sympathy, gentle methods and, above all, the patience of the staff; second, the direct mental and physical benefit to be derived from "curative workshops." The latter have proved very valuable. The governing principle in regard to this curative work is founded on the proven belief that active voluntary movements are of infinitely greater value than passive movements. The exercises which are employed may be direct or indirect. The indirect is often the best as "when a man with a stiff ankle is set to planing or sawing wood he unconsciously uses the ankle, as he gets interested in the work which his hands are doing". The periods of physical work are advantageously alternated with periods of rest which are employed in instruction; from the psychological standpoint this "secures the man's productive occupational treatment".

As many influences as possible—sympathetic, explanatory, persuasive,—should be brought to bear upon the wounded man both before and after his discharge to make him cognizant of the potentialities of the cripple. Free use should be made of technical and other schools while the last stages of the restorative treatment are being carried out in out-patient institutes; and when the man is ready, employment bureaus should lend their aid in securing the proper work.—A. O. W.

Surgical Sociology

Ira S. Wile, M.D., Department Editor.

APPLIED ROCKEFELLERISM.

The accumulation of capital is to many an inherent reason for reproach and condemnation. In fairness to those who possess millions, scrutiny should be given as to the use made of their wealth. The development of our economic system has fully indicated the necessity and value of large financial units for carrying on vast enterprises. Today we are learning to talk in terms of billions as the generation that has passed was wont to speak of millions; and hundred thousands were rare fortunes two generations ago.

Judged from the point of view of a definite policy for the expenditure of funds, the Rockefeller Foundation affords an illustrious example. A fund of $120,000,000 affords an income, which during the past year was inadequate to pay expenses of the various enterprises fostered or originated and developed under its auspices. The aim of those in charge of this large fund has been to demonstrate the value of specific undertakings and then to turn them over for further support to the communities to be benefited by their continuance. This, of course, does not pertain to the special war activities carried on thruout the world for the purpose of relieving the destitute and suffering, altho some particular problems are being attacked for the purpose of demonstrating to governments their value in the protection or reconstruction of communities against the ravages of disease or the disabling effects of war wounds. A large measure of the program is designed to improve the public health, to preserve human life, to foster the welfare of the race, and make possible a happier and a healthier world after the trumpets of war will have been stilled.

The Rockefeller Institute for Medical Research has had added to it a portable military base hospital, itself a model, in which demonstrations are being made of the value of the Carrel-Dakin methods of caring for wounds and injuries. At the same institution, medical officers of the Army and Navy are receiving instruction in war surgery, bacteriology, and the technic of the treatment of pneumonia, meningitis, and gas-gangrene.

The large part that mental hygiene is playing in the present war has been developed thru the survey made by Major Salmon whose studies of conditions in the belligerent countries were made possible by money supplied by the Foundation. The survey of the tuberculosis menace in France, was made by Dr. Herman Biggs under the direction of the International Health Board of the Rockefeller Foundation. As a result of this investigation, France now has an opportunity of studying a highly organized method of dispensary service, methods of popular education concerning tuberculosis, and the establishment of centers for the training of workers and visiting nurses for the care and instruction of the tuberculous. Tuberculosis control, therefore, is another feature of the public health work being undertaken under these auspices.

The institution of a School of Hygiene and Public Health as part of Johns Hopkins University, marks a step in advance in the educational work of this country, and in all likelihood it will become a national center for research and teaching along lines generally described as belonging to preventive medicine.

The campaigns throut the world against hookworm, malaria and yellow-fever, involving improved public health administration, more adequate legislation, and carefully organized public health education, have not merely added to our knowledge concerning these diseases and the methods of their control, but has added to the efficiency of the communities in which such work was undertaken and has made available a higher percentage of the vital resources of those countries.

The work of Dr. Grenfell in Labrador may have been the basis of an experiment in supplying a mobile dispensary unit in the form of a hospital ship for meeting the needs of the natives of the Philippine Islands and the Sulu Archipelago. A floating dispensary of this character suggests the possibility of the development of a series of mobile automobile dispensaries operating in rural communities from a fixed base hospital, as their center. Undoubtedly the Rockefeller Foundation will undertake this further experiment, following out their plan of assisting new but worthy enterprises upon the agreement that if proven to be a success, the expenses thereafter will be met by the authorities originally assisted.

When the future history of the great republic of China is written, the story of its medical development will be a monument to the enthusiasm and devotion of medical missionaries and to the vision of the China Medical Board acting for the Rockefeller Foundation. Its initiative has given rise to the Pekin Union Medical College with its pre-medical school, laboratories, hospital wards, dispensary service, together with various other institutes for which financial aid and encouragement have been provided.

This brief and incomplete résumé of the public

health acttivities of the Rockefeller Foundation attests a scientific interest in medical problems and public health, and should promote a better understanding of the possibilities of accomplishment thru the intelligent use of large capital. When one appreciates the vast expenditures involved in war and recognizes in how far the baneful effects are offset by constructive programs one is filled with a sense of appreciation of, and enthusiasm for, the efforts and results that have attended the spending of some of Mr. Rockefeller's accumulations. Without entering into discussion as to the economic principles involved in the accumulation of large fortunes, it is patent that the general benefit to the world thru scientific and sane spending may offset much of the misunderstanding and abuse which is visited upon those in the multi-millionaire class.

Medicine and surgery owe much to the beneficent contributions of the wealthy. While the scientific accomplishments redound to the credit of the carefulness, accuracy, perserverance, and vision of the medical and surgical fraternity, it cannot be forgotten that their results frequently were made possible by philanthropists, blessed with financial means and not lacking in public spirit and public conscience.

Book Reviews

Preventive Medicine and Hygiene. Milton J. Rosenau, Professor of Preventive Medicine and Hygiene. Harvard; Director of the School of Health Officers of Harvard University and the Massachusetts Institute of Technology. Formerly director of the Hygienic Laboratory, U. S. Public Health Service. *Third Edition,* containing a special section on Military Hygiene. D. Appleton & Company, 1917.

This volume represents a new and welcome revision of Rosenau's well known work. The book comprises thirteen sections each a fairly complete symposium on a branch of sanitation and hygiene. The last section is a timely contribution to war hygiene containing valuable information on many subjects such as the recruiting of soldiers, control of diseases and the choice and sanitation of camps and barracks.

Section one considers the prevention of communicable diseases. There are six subdivisions, the last one by Thomas W. Salmon on Mental Hygiene. The others on diseases grouped according to their specific prophylaxis, or mode of communicability. Section two deals with immunity, heredity, and eugenics. The immune responses of disease are explained according to the best accepted theories and experimental data. A chapter on anaphylaxis is quite comprehensive yet lucid in its detailed description and definitions.

Section three takes up food, its uses, classification, decomposition, adulteration, preparation and preservation. The animal and plant foods are considered in separate chapters. In the same manner a section is devoted to the air; another to the soil; still another to the water. Section seven is on sewage disposal and is written by George C. Whipple; section eight on refuse disposal by the same author. John W. Trask wrote a section on vital statistics. The final sections deal with industrial and occupational diseases, schools and disinfection.

Throughout the book the author displays a wide knowledge systematized, made valuable by illuminating experiments and experiences. The volume is full of information, invaluable to the sanitarian and not without profit for the practicing doctor. The charts and illustrations are clear, the text well printed.

Diagnostic and Therapeutic Technic. A Manual of Practical Procedures Employed in Diagnosis and Treatment. Albert S. Morrow, A.B., M.D., Clinical Professor of Surgery in the New York Polytechnic; Attending Surgeon to the Workhouse Hospital, and to the Central and Neurological Hospital. 834 pages with 860 illustrations, mostly original. *Second Edition.* W. B. Saunders Company, 1917.

In the book Morrow plans to present first, a general consideration of diagnostic and therapeutic measures and, second, to explain and describe the many and various procedures employed in the diagnosis and treatment of diseases affecting the special organs and regions of the body. Separate chapters are devoted to the measures used for the ear, the nose, larynx and trachea, stomach, and genito-urinary system. Exploratory punctures receive special descriptions, also methods of infusion and transfusion. In the latter instance no mentiton is made of the recent advances in direct transfusion as advocated by Lindeman and Unger, or the transfusion of cetrated blood as suggested and demonstrated by Lewisohn and Weil. The value of iso-agglutinins and iso-hemolysis with their special significance in the selection of transfusion donors is not sufficiently stressed.

In the chapters given over to genito-urinary procedures there are not included the neoseuthal renal test meal, a proper interpretation of the chemical findings in the blood of non-protein nitrogeneous products nor any indication of the value of the ambard coefficient as simplified by MacLean, the important contributions of Rehfus to gastric diagnosis are not included; also artificial pnuemothorax as proposed and used by Forlanini and Murphy has found no place in this volume.

Yet the book contains innumerable methods and procedures of tried usefulness. These are clearly illustrated and described simply. The surgical technic is especially well presented.

Laboratory Methods of the United States Army. Compiled by the Division of Infectious Diseases and Laboratories, Office of the Surgeon-General, War Department, Washington, D. C. Illustrated. Lea & Febiger, 1918. Price, $1.50.

This manual is not a text book. It is prepared for those who are familiar with bacteriology and its practical uses and applications. It is designed to be a ready, convenient compendium for laboratory workers. It contains, therefore, in most compact form, accounts, information and data on standard solutions, staining fluids, media, etc., also tables for reference.

The newest accepted methods are included. The last 100 pages are devoted to special bateriological methods vs. typhoid carriers' problem, Schick reactions, cultural grouping of pneumococci, etc., and to sanitary examinations of milk, water and sewage.

Surgical Clinics of Chicago. February, 1918. *Volume 2, No. 1,* with 73 illustration. Philadelphia and London. W. B. Saunders Company, 1918.

This volume contains a large number of timely articles all written in their usual excellent manner and well illustrated; deserving of special mention are those of Major Speed, Dr. Dyas and Dr. Parker. The last takes up the non-operative therapeutic measures which are employed in the commoner orthopedic conditions. A case, in which the method of reconstructing the common duct is shown, is described by Dr. Bevan.

Progress in Surgery

A Résumé of Recent Literature.

A Further Study of the Use of Chloroform in Labor. I. H. HILL, *American Journal of Obstetrics.* February, 1918.

Hill contends that the delayed pernicious effects from chloroform have been noted chiefly in surgical cases and those obstetric deliveries where prolonged operative measures were necessary. In such case ether is preferable. But from chloroform used to the point of obstetric analgesia only, Hill maintains there can be no delayed viceral poisoning. Too little altogether is thus given for organic changes to take place. Hill administers the chloroform in such fashion that the first few pains are entirely obviated by it, then gives less and depends on suggestion to keep the patient in a quiet state of mind. The psychic effect is made possible and accentuated by a few drops of chloroform judiciously given.

Large Pedunculated Cavernous Angioma of the Liver Reaching Down into the Pelvis and Causing Obstetric Difficulty, I. C. RUBIN, *American Journal of Obstetrics.* February, 1918.

Rubin reports a case of a giant size tumor of the liver which was palpable by vaginal examination and which was operated on the diagnosis of an ovarian tumor. It proved to be a huge cavernous hemangioma of the liver and weighed four pounds and twelve ounces, appearing to be much larger than the liver itself from which it sprang by a short, thick pedicle. The tumor was removed with practically no bleeding taking place and the patient made an uneventful recovery.

The further interest in the report is the circumstance that in the last confinement of the patient, who was thirty-three years old, her abdomen had assumed such large proportion that she was unable to move about, and had sharp pains in the right hypocchondrium. She was regarded as carrying twins. Induction of premature labor was decided upon because it was deemed the child was too large to be born eventually per viam naturalis. The patient had previously been delivered of *four twins* and had thirteen children altogether. It was only after the last previous child-birth that the patient noticed the presence of this tumor. This gradually became larger, so that at the seventh month of pregnancy her abdomen seemed much larger than on prevoius occasions when she actually bore twins.

The physical examination elicited one point which the author points out could have established the proper diagnosis in the case he reports, if properly stressed; namely dullness over the tumor area from the pelvis up to the liver area with which it was continuous. But the rarity of this condition in contrast to the more common complication of ovarian tumors in pregnancy will probably in similar occasions favor the diagnosis of the latter. As for the presence of an angioma of this size, laparotomy alone will be the determining factor.

Uncinariasis in Pregnancy, G. FRASER WILSON, *American Journal of Obstetrics.* February, 1918.

Wilson calls attention to a form of toxemia in pregnancy ocurring in women of the rural districts, in mill and factory workers and those living in settlements. In many a history of "ground itch" may be elicited. The patient is usually pale, cadaverous, and sallow of complexion; looks not unlike a person suffering from chronic malaria with edema, flashes before the eyes and dizziness. Examination of the washed stools will reveal in these cases either the ova or the worms or both. A marked eosinophilia is always present. The therapy consists in fifteen drops of chenopodium oil repeated in an hour and repeated every week for three or four weeks and followed each time by a laxative, preferably castor oil. The oil of chenopodium is best given in capsules and is superior to thymol because of its freedom from toxic symptoms. Attention to the general health is also very important.

A Case of Gangrene of Uterine Fibroid Following Parturition; Panhysterectomy. RALPH WALDO, *American Journal of Obstetrics.* February, 1918.

Waldo removed a uterus which was the seat of a sloughing, gangrenous submucous fibroid in a patient 24 years old, some four days after the delivery of a premature child. There was some antepartum temperature which was higher after delivery. The submucous fibroid was felt by the examining finger. The patient recovered after going through an attack of lobar pneumonia and an infection of the abdominal wound. This took place in spite of all precautions being taken to prevent secondary infections. Waldo recommends panhysterectomy early in such cases in order to prevent peritonitis.

The Cholesterol Content of the Blood in Gall-Stone Disease, STANLEY P. REIMANN and J. A. H. MAGOUN, *Surgery, Gynecology and Obstetrics.* March, 1918.

The authors have made cholesterol determinations in the blood of sixty patients with histories relating to upper abdominal lesions and contrast their findings with those of the subsequent laparotomies. It is interesting in view of the recent reports in the literature emphasizing the diagnostic value of cholesterinaemia in gall-stone disease, to note Reimann and Magoun's conclusion that a hypercholesterinaemia has no significance in the differential diagnosis of cholelithiasis. A hypercholesterinaemia is not constantly present in cholelithiasis, while many other conditions may affect the quantity of cholesterol in the blood.

Results Obtained by Tonsillectomy in the Treatment of Systemic Disease. DANIEL W. LAYMAN, M.D., Indianapolis, Ind., *The Laryngoscope.* February, 1918.

Layman advocates the early removal of the tonsils as a prophylactic measure. He sent a questionnaire to a number of laryngologists and internists and the consensus of opinion bore out his contentions. He quotes from La Fetra that children whose tonsils have been removed are much less susceptible to respiratory and gastrointestinal disease. He has noted no cases of maldevelopment from early tonsillar removal and measles; scarlet fever and whooping cough in these children take a milder course.

The relationship of focal infections to systematic disease was first pointed out by laryngologists in connection with the tonsils. He tabulates, from his questionnaire, a list of very favorable results from tonsil removal in arthritic and cardiovascular conditions. Thyroid infection seems to be very favorably influenced by tonsillectomy. Some men of experience in thyroid work, notably Crile and Halstead and the Mayos, operate upon the thyroid first and later remove the tonsils to prevent a recurrence of hyperthyroidism.

Hookworm Disease. S. T. DARLING, M. A. BARBER, and H. P. HACKER, New York. *Journal of the American Medical Association,* February 23, 1918.

An elaborate paper based on the work of the Rockefeller Foundation in the Malay Peninsula, Java and Fiji Archipelago, covering two and one-half years, is presented. The principal point is the comparative merits of oil of chenopodium and thymol in the treatment of the disease. Their methods of obtaining, counting and classifying the worms, and the relative efficiency of various drugs in expelling them and methods of preparation of the patients and administration of the treatment are given in considerable detail, and they find that oil of chenopodium is by far the most efficient. What they call the half maximum dose (0.5 c.c. three times, or 1.5 c.c.) of oil of chenopodium is the preferable routine treatment. It does not have the toxic effects of the full dose, and two treatments have the very satisfactory result of removing 99 per cent. of the worms present. It has the additional advantage of more uniform action, and is less unpleasant to the taste than thymol. Thymol has an advantage over this half dose of oil of chenopodium, in that the 90 grain dosage produces a better result when single treatments are compared. This disappears, however, when two half doses of oil of chenopodium are used, and a dose of 90 grains used indiscriminately would lead to serious results.